

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listing, of claims in the application.

1-78. (CANCELED)

79. (NEW) A purified nucleic acid molecule

(a) selected from SEQ ID NOS: 8, 9, 10, and 11;

(b) that encodes a peptide selected from SEQ ID NOS: 1, 2, 3, and 4;

(c) that hybridizes to either strand of a denatured, double-stranded DNA comprising the nucleic acid molecule of (a) or (b) under conditions of moderate stringency;

(d) derived by *in vitro* mutagenesis from SEQ ID NOS: 8, 9, 10, and 11;

(e) degenerate from SEQ ID NOS: 8, 9, 10, and 11 as a result of the genetic code;

(f) that encodes Tc45 polypeptide, an allelic variant of Tc45 polypeptide, or a homolog of Tc45 polypeptide;

- (g) that encodes an eukaryotic protein with an amino acid racemase activity;
- (h) that encodes an eukaryotic protein with a proline racemase activity;
- (i) that encodes an eukaryotic protein, which is recognized by antibodies raised against an eukaryotic protein having proline racemase activity;
- (j) that has at least 80% of identity with the sequence of an eukaryotic gene encoding a protein with a racemase activity; and/or
- (k) that is a fragment of a polynucleotide containing at least 50 nucleotides of the sequence of the proline racemase gene of *T. cruzi* or hybridizing under stringent conditions with a polynucleotide according to any one of (g), (h), (i) or (j).

80. (NEW) A recombinant vector that directs the expression of a nucleic acid molecule of claim 79.

81. (NEW) A purified polypeptide

- (a) that is encoded by a nucleic acid molecule of claim 79;
- (b) that has a molecular weight of approximately 45 kDa as determined by SDS-PAGE, which is post translationally modified or not;
- (c) that is an eukaryotic protein with proline racemase activity;
- (d) that is a protein of (c), which is a P38 to P45 kDa protein;

(e) that is a P38 to P45 kDa protein according to (d), which is a parasite protein;

(f) that is a P38 to P45 kDa protein according to (e), wherein the parasite is *T. cruzi*;

(g) that is a purified eukaryotic amino acid racemase having a molecular weight of 38 kDa to 45 kDa more or less 10%; and/or

(h) that is a Tc45 polypeptide.

82. (NEW) Purified polyclonal or monoclonal antibodies that bind to a polypeptide of claim 81.

83. (NEW) A host cell transfected or transduced with the vector of claim 80.

84. (NEW) A method for the production of Tc45 polypeptide comprising culturing a host cell of claim 83 under conditions promoting expression, and recovering the polypeptide from the host cell or the culture medium.

85. (NEW) The method of claim 84, wherein the host cell is selected from the group consisting of bacterial cells, parasite cells and eukaryotic cells.

86. (NEW) A recombinant vector as claimed in claim 80, which is a plasmid deposited at CNCM under the Accession Number I-2221 or I-2344.

87. (NEW) An immunological complex comprising a Tc45 polypeptide and an antibody as claimed in claim 82.

88. (NEW) A method of detecting a parasite in a biological sample, said method comprising:

(a) contacting parasite DNA of the biological sample with a primer or a probe, which hybridizes with the nucleic acid molecule of claim 79;

(b) amplifying a nucleotide sequence using said primer or said probe; and

(c) detecting a hybridized complex formed between said primer or probe and the DNA.

89. (NEW) A method of detecting a parasite in a biological sample, said method comprising:

(a) contacting the parasite extract or the biological sample with antibodies as claimed in claim 82; and

(b) detecting the resulting immunocomplex.

90. (NEW) A kit for detecting a parasite, said kit comprising:

(a) a polynucleotide probe, which hybridizes with the nucleic acid molecule of claim 79; and

(b) reagents to perform a nucleic acid hybridization reaction.

91. (NEW) A kit for detecting a parasite comprising:

- (a) purified antibodies as claimed in claim 82;
- (b) standard reagents for performing an immune reaction; and
- (c) detection reagents.

92. (NEW) An *in vitro* method of screening for active molecules capable of inhibiting a polypeptide encoded by a nucleic acid molecule as claimed in claim 79, said method comprising the steps of:

- (a) contacting the active molecules with said polypeptide;
- (b) testing the capacity of the active molecules, at various concentrations, to inhibit the activity of the polypeptide; and
- (c) choosing the active molecule that provides an inhibitory effect of at least 80% on the activity of the said polypeptide.

93. (NEW) A process of preparation of a purified eukaryotic protein as claimed in claim 79(g) or claim 81(c) with a racemase activity comprising:

- (a) selecting a gene encoding a protein having a racemase activity;
- (b) transforming a host with a recombinant vector containing the gene;

- (c) culturing the host and producing the protein encoded by the gene; and
- (d) separating the purified eukaryotic protein with the racemase activity from the culture; or separating the purified eukaryotic protein recognized by antibodies raised against said protein as claimed in claim 79(g) or claim 81(c).

94. (NEW) A process for detecting a *T. cruzi* infection by contacting purified P45 protein and fragments or peptides thereof, which are recognized by antibodies raised against a polypeptide as claimed in claim 81, with serum of a patient suspected to be infected.

95. (NEW) An immunizing composition containing at least a purified protein as claimed in claim 81 or a fragment thereof, in an amount sufficient to induce an immune response *in vivo* or to induce the inhibition of a mitogenic polyclonal immunoresponse *in vivo*, wherein the immunizing composition optionally contains a pharmaceutically acceptable carrier therefor.

96. (NEW) A vaccine composition against a *T. cruzi* infection containing the purified P38 to P45 kDa protein or a fragment thereof according to claim 81.

97. (NEW) A process for screening a molecule capable of inhibiting the amino acid racemase activity of a eukaryotic protein comprising:

- (a) contacting the purified eukaryotic racemase protein with standard doses of a molecule to be tested;

(b) measuring inhibition of racemase activity; and

(c) selecting the molecule.

98. (NEW) A method of inhibiting a eukaryotic protein with an amino acid racemase activity, which comprises treating a patient by administering an effective amount of a molecule that can be selected by the process of claim 97 that inhibits said eukaryotic protein.

99. (NEW) Method according to claim 98, wherein the parasite is *T. cruzi*.

100. (NEW) A method for producing an eukaryotic recombinant amino acid racemase as claimed in claim 79(g) or claim 81(c) comprising:

(a) culturing a bacterial or a eukaryotic host harboring an over- expression system including an insert containing a polynucleotide sequence encoding an eukaryotic amino acid racemase;

(b) separating the recombinant eukaryotic amino acid racemase from the host proteins; and

(c) purifying the eukaryotic amino acid racemase.

101. (NEW) A method according to claim 100, wherein the amino acid racemase is a proline racemase.

102. (NEW) A method according to claim 100, wherein the recombinant bacterial host contains an insert derived from the insert contained in the strain deposited at CNCM under Accession number I-2344.

103. (NEW) A method for the production of D-amino acid using a purified eukaryotic amino acid racemase comprising:

- (a) incubating L-amino acid with the recombinant eukaryotic amino acid racemase;
- (b) separating the D-amino acid produced in (a); and
- (c) purifying the D-amino acid.

104. (NEW) A method of preventing or inhibiting infection by a virus or a protozoan parasite *in vivo*, wherein the method comprises administering to a subject in need thereof a virus or a protozoan parasite mitogen in a sub-mitogenic amount sufficient to induce a protective immune response against the virus or the protozoan parasite in the subject, wherein the virus or protozoan parasite mitogen is optionally administered to the subject in admixture with a pharmaceutically acceptable carrier.

105. (NEW) The method of claim 104, wherein the virus mitogen is an animal or human virus mitogen in natural or recombinant form.

106. (NEW) The method of claim 105, wherein the subject is a human.

107. (NEW) The method of claim 106, wherein the mitogen is a protozoan parasite mitogen of *Plasmodium berghei* in natural or recombinant form, or of *plasmodium falciparum* or *plasmodium vivax* in natural or recombinant form.

108. (NEW) A method of detecting a eukaryotic protein as claimed in claim 81 in a sample comprising:

(a) contacting the sample with antibodies raised against an amino acid racemase; and

(b) detecting the resulting immunocomplex.

109. (NEW) A molecule for preventing or treating a parasite or a virus infection, wherein said molecule can be selected by the process of claim 97 and inhibits a parasite or a virus racemase activity.